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ABSTRACT

As the traditional water carriers and water managers, third world women are crucial to the success of rural water supply projects whose short term goal is increased water quality and quantity and whose long term goal is improved family health. Change depends on the utilization of local learning systems of the society and women are most often the controllers and purveyors in these systems. Local learning systems provide linkage among "what" community development is, "how" it works in rural water supply projects, and "why" women must be included for project success and continuing community controlled growth and development. An operational framework (including technology, maintenance, local learning systems, and community participation) can be used to explain how community participation works in specific rural water supply projects. The local learning system framework provides a design tool that indicates probabilities of success for different technologies, and an implementation tool that guides the type, amount, and direction of information through community participation techniques. The framework offers women the strength of their traditional power, and offers the community a design and implementation technique that recognizes the inviolability of their inherent control. (BRR)

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WOMEN IN DEVELOPMENT

SUCCESSFUL RURAL WATER SUPPLY PROJECTS AND THE CONCERNS OF WOMEN

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SUCCESSFUL RURAL WATER SUPPLY PROJECTS AND THE CONCERNS OF WOMEN

by
Paula Roark

September, 1980

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PREFACE

The concept of local learning systems was introduced to me by my Voltan colleagues at the Institute of National Education in Upper Volta. They were interested in these systems as a vehicle for the management of new knowledge in the rural community, and as a basis to integrate the 'theory' of the formal systems of education with the 'knowhow' of the nonformal and informal systems. Later, working as a social analyst for the design of a USAID village water project in Upper Volta, I was able to identify the 'local learning system' that was responsible for traditional water technology, and to some extent primary health care, in several rural villages that I surveyed in the project area.

From this experience, it became obvious to me that the rural water local learning systems were just a more specific example of the general local learning system of the entire village or community that we had been concerned with at the Institute. The next step, of course, was to describe how this more specific system could serve as a vehicle for the management of new knowledge in the community, and if it did so, the impact on rural water supply projects themselves. This then was the beginning impetus for this paper.

Several caveats to this work must be delineated. First, the paper is written without specific reference to a geographical area. It is possible to do this and still be very specific about design and implementation problems because of the integration of local learning systems with the technology and maintenance of rural water systems. But it must be pointed out that local learning systems have only been observed by the author in societies where there has been a tradition of communal self help. This relationship seems to also exist in the relevant literature. On the other hand, the societies that have this tradition are found throughout the world and includes most of Africa, a good part of Central and South America and portions of Asia.

The second caveat that the reader should be aware of is the mixture of field observation and concept or theory building. Section three--the issues of rural water supply and women--is all based upon field observation. Section four--the operational framework of the local learning system--is a conceptual framework based upon field observation, but it has not been field tested. Hopefully, that will be an eventual outcome of this report.

About the Author

Paula Roark is a learning and community development specialist. As a Fulbright-Hayes Exchange Professor in Upper Volta, West Africa,

she conducted original research concerning the integration of the school system with the national development policies of Upper Volta under the auspices of the Institute for National Education. For AID, she was the social analyst on a design team for village water supply in Upper Volta. Presently, she is working for Louis Berger and Associates evaluating the community extension component of the National Demonstration Water Project, a nationwide program to improve water and sanitation service delivery and increase rural community development capabilities. She is also teaching community development and community decision strategy classes in the Department of Family and Community Development, University of Maryland.

SUMMARY

The high vulnerability of rural water supply projects to social and behavioral factors has been well documented. The combination of this documentation with the increased interest of both donor organizations and countries in the provision of basic human needs, has changed the design and implementation priorities of rural water supply projects.

One of the emergent major concerns is that of community participation. Despite a variety of studies that describe a strong correlation between measured project success, both in terms of productivity and social welfare, and effective community participation, there is no agreed upon definition from which to proceed. The purpose of this paper is to define "what" community participation is, "how" it works in rural water supply projects, and "why" women must be included for project success and continuing community controlled growth and development. Local learning systems are the linkage among these three areas of discussion.

In this paper community participation is defined as the learning process as communities deal with change and development. This is based upon Paulo Freire's definition of the learning process of reflection/action/reflection through dialogue. Using this definition, it becomes clear that participation is the essence of the learning process, and control of the knowledge outcome of this learning process is the reason for community participation. This definition explains why it is so important to project success, and "what" community participation is all about.

The importance of the role of women in this community participation or learning process in rural water supply projects becomes apparent through field observation. In these projects the short-term goal of increased quantity and quality of water for the community is dependent upon the community's willingness to use and maintain the new water supply. Women as the traditional water carriers and water managers decide whether to use the water source and whether it is worth the expenditure of effort to maintain or have it maintained.

The long-term goal of improved health of the family is dependent upon changing community perceptions of the relationships between water borne diseases and the surrounding environment. But water management practices are deeply imbedded in the social fabric of the community, and therefore cannot be affected by imported health education strategies. Rather, change depends upon the utilization of the local learning systems of the society. Women are most often the controllers and

the purveyors in these systems. Because these are "local institutions" in which women have traditionally held power, they are a vehicle within which the inclusion of women as participators and leaders is appropriate.

There are two main emphases in the paper. The first is rural water supply and the concerns of women. The center of this concern is maintenance. The specific issues of water resource reliability, access to the water source, and the trade-offs between quantity and quality of water, describe the spectrum of issues with which women are concerned and over which they have considerable power. Because of the failure of many, if not most, rural water supply projects to remain operative two to three years after installation, these issues have become as important as the technical site construction.

The second emphasis is the integration of technical and social aspects of rural water supply design and implementation in order to achieve greater project success. Description of an operational framework, including the factors of technology, maintenance, local learning systems, and community participation, is described in the paper. This framework explains "how" community participation works in rural water supply projects. It can functionally describe a culturally specific situation, through first, capitalizing on the generalizations available from the conceptualization of learning as a process, and secondly the generalizations available from focusing on the subject area of rural water supply itself. The framework is thereby able to explain and clarify to a greater extent how the lack of integration, or the type of integration, for the software and hardware components, affects success.

This operational framework has four components and is a generalized conceptualization of the local learning system. The analysis component defines the difference between present technology of the community and the proposed technology in terms of type and amount of change. The definition component defines the learning process in terms of community participation. This process is by its very nature is community controlled and directed management of new knowledge for the evolvement of new but shared community perceptions. The information component is the basis for the community participation techniques of problem posing and participatory research. The knowledge outcome component is the basis for the community participation techniques of leadership and decision making strategies.

Utilization of the analysis component by project planners will allow them to ascertain, using a proposed water technology as a reference point, whether it is user perceived as either a service or development project. Service projects call only for the minimal participation strategies of community leadership because there is no social

change involved and people have essentially given their consent. Development projects call for the major community participation strategies of problem posing and participatory research that will facilitate the community controlled process of value decisions and resulting technology control. The type and amount of change will indicate probability of success, and the type of community participation techniques that will be needed in project implementation.

The operational framework of the local learning system incorporates the hardware technology with the software motivation of the community into a design tool that indicates probabilities of success for different technologies, and an implementation tool that guides the type, amount, and direction of information through community participation techniques. It continues to offer women the strength of their traditional power, and offers to the community a design and implementation technique that recognizes the inviolability of their inherent control.

Conscious that insufficient and unsafe drinking water and the lack of sanitation facilities together contribute to diseases that cause death among the world's poor in developing countries,

Realizing that the major consequence for the 1.5 billion people who presently live under such conditions is a heavy burden of disease, increased suffering and hardship, stunted growth and development, and diminished productivity,

Conscious that the majority of people living in poverty must survive with less than 10 liters of water per person per day, compared to modern western consumption of 350 liters per day per person,

Mindful that the difficult job of procuring and rationing water is the responsibility of women, where, as water carriers and water managers, the daily collection of household water claims more than one third of the woman's work day.

excerpt, U.S. Delegation Draft Resolution
Mid-Decade International Conference of
Women, Copenhagen, 1980.

INTRODUCTION

The Problem

Within the past fifteen years the development of urban and rural water supply and sanitation systems has become a major priority in third world countries. Donor organizations have attempted to help meet this need with implementation of a variety of urban and some rural water supply projects.[1] Donor projects of the fifties and sixties concerned themselves, for the most part, with increase of clean "potable" made available to mainly urban communities through utilization of higher technologies such as house taps and community standpipes.[2] The costs of such ventures however, precluded the

[1] World Health Statistics Report, WHO, vol. 29, no. 10, Geneva, 1976.

[2] See McJunkin (1969) for a historical summary of USAID activities in rural water and sanitation programs from the mid-forties to the mid-sixties.

possibility of any truly massive campaigns.

Even more disturbing however, was the obvious failure of the recipient communities of water supply projects to take responsibility for pump or fountain maintenance. OECD statistics indicate that 35 percent to 50 percent of pump installations in developing countries are inoperable three to five years later.[1] Realization of this state of affairs belatedly identified the concerns of local maintenance capability, levels of service to be rendered by national and regional government, community participation and community control, and health education, as major factors to be considered in project design and implementation.[2]

This past decade has also witnessed a major shift in development priorities. During the 1950's and early 1960's water supply and sanitation installation projects were given low priority because they did not directly contribute to economic development. Revaluation of the importance of basic human needs brought about a new prioritizing of development activities in the late sixties and seventies.[3]

A direct outgrowth of these new priorities is the U.N. Declaration of 1981-90 as the "International Decade on Drinking Water and Sanitation". The stated objective of the Decade is to meet the needs of the 1.5 billion people in the developing countries that do not have access to adequate supplies of safe water or adequate sanitation facilities. The goal of the Decade is to bring clean water and sanitation to all peoples of the world by 1990. These goals depend upon the priority given to them by the countries themselves, and the increased external cooperation of international donor organizations in support of national country action.

The Declaration of the Decade itself has created a positive congruence between the political realities that shape the financial directions of international aid and the new perceptions of the factors and strategies needed for project success. In essence, all of the pieces of the puzzle are present: the people and groups involved in project design and implementation have become sensitized to the complexities of the problem; correct theoretical components have been discussed; and the monetary and political resources have been brought together under the aegis of the Decade.

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[1] Imboden, Nicholas, 1977.

[2] U.N. Water Conference, Mar del Plata, 1977.

[3] See Ian Burton's "Policy Directions for Rural Water Supply in Developing Countries", AID, 1979, pages 1-3.

However, it is now necessary to bring together the well understood technical necessities with these more recently understood social factors. Therefore, the purpose of this paper is to better define the relationship and interdependencies that exist between the technical and social or behavioral factors in rural water supply projects.[1] A critical factor in this relationship is community participation. However, despite a variety of studies that describe a strong correlation between measured project success, both in terms of productivity and social welfare, and effective community participation, there is no agreed upon definition of 'participation' from which to proceed.

Because of recent increasing interest in 'women in development' and because women in third world countries serve in the roles of water managers and family educators, 'community participation' has been extended to specifically include women's voices. This inclusion of women has been looked upon by some as merely politically expedient, while others have viewed it as necessary from an equity standpoint. However, it is the basic premise of this paper that the active help and support of women must be sought and gained in order to achieve success in rural water supply projects.

The clarification of the relationship between the technical and behavioral factors will be accomplished through defining "what" community participation is, "how" it works in rural water supply projects, and "why" women must be included for project success and continuing community controlled growth and development.

Community Participation: Recognizing the Need is Different from Knowing How

The high vulnerability of water supply and sanitation projects to social and behavioral factors in terms of maintenance and use has been well documented. Saunders and Warford (1976) note the distressing rate of water supply system failures in the field. Feachem (1978) brought to our attention the fact that although the relationship between water and disease is widely acknowledged, strict water supply and sanitation projects did not often have the

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[1] See, for instance, the Development Alternatives Incorporated (DAI) study, Strategies for Small Farmer Development. T.I. Bennell, OECD occasional paper #8, 1979; Rowland, OECD occasional paper #6, 1978.

impact expected of them in terms of health. All of this has served to focus interest in community participation for water supply and sanitation projects. Gilbert White and Anne U. White note: that "although there have been only a few systematic studies of the circumstances in which new projects have failed because of lack of receptivity by the user community, the literature is replete with anecdotal evidence of these events".[1] M.G. McGarry states that "participation was the key to success in bringing piped water to over 150,000 villagers in the water scarce category at a cost of less than $3 per capita.[2] David Donaldson reports that one of the three fundamental concepts for water supply and sanitation projects in the Americas is "strong and active community participation in the development, construction, administration, and financing of the local systems".[3] Anne Whyte states that "the role of community participation in making RWS (rural water supply) schemes more acceptable to local people, and thus more likely to be maintained and used, has changed from being a luxury to a necessity--or from a question mark to accepted dogma."[4]

The need for community participation in rural water supply is obvious, the acceptance at the policy level is apparent, but the concept itself remains abstract. In other words, we know what we need, we accept that we need it, but the question of how to achieve it has not been adequately addressed. In fact, the IRC's Participation and Education in Community Water Supply and Sanitation Programs: A Literature Review (1979)[5] describes a disturbing but true phenomenon.

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[1]White, Anne U. and Gilbert F. White, "Behavioral Factors in Selection of Technologies", Appropriate Technology in Water Supply and Waste Disposal, ASCE, 1978, pp. 26-27.

[2]As quoted in Ted Jackson, "Rural Sanitation Technology", Assignment Children, 45/46, Spring, 1979, p. 59.

[3]Donaldson, David, "Rural Water Supply in Latin America", Assignment Children, 34, April-June, 1976, p. 49.

[4]Whyte, Anne, "Appraisal Study on the Relevance, Need and Feasibility of an Action Plan on Extension and Community Participation in Water and Sanitation in Developing Countries", Revised, September, 1979, p. 3.

[5]WHO International Center for Community Water Supply, prepared by Christine Van Wijk-Sijbesma, 1979. This is the most comprehensive publication to date concerning community participation and water supply projects.

> In spite of all our general "knowledge" about community participation, it is still unknown how to effect it in practice. This has led to a situation where the expression "community participation" is used very frequently to indicate a wide range of ideas and actions. In fact, it has become so fashionable that many people are beginning to feel a certain aversion to it.[1]

Participation as a working concept continues to remain imprecise and inaccurate in terms of methodology and objective.

> Those who have studied appropriate technology for rural sanitation agree that such an approach requires community participation. However, the literature indicates a lack of agreement about what kind of participation, and about participation by whom and for whom.[2] (author's italics)

This inadequacy of analysis is due partially to the superficial accessability of the concept itself in democratically governed societies--"oh yeah, sure, let's have a meeting and ask them if that's what they want". It is also ascribable to the different ideological bases from which development projects in general and rural water supply projects in particular have grown.[3]

Women as Community Participators

Because of increasing interest of 'women in development' at all levels, and because women in third world countries have been recognized, albeit somewhat belatedly, as representing fifty percent of the human resource bank, community participation has been extended to specifically include women's voices. Because of their roles as water carriers, water managers, and family health educators, their role in water and sanitation projects has been increasingly recognized over the past five years.[4]

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[1] Ibid., preface.

[2] Jackson, op. cit. pp. 55-56.

[3] Ibid., p. 56.

[4] For instance, see United Nations Water Conference, "Water, Women, and Development", Mar del Plata, 1977; Elmendorf, Mary, "Women, Water, and Waste: Beyond Access",1980; Whiting, M. and Krystall, A., "The Impact of Rural Water Supply Projects on Women", Care, Nairobi, mimeo, no date. It is interesting to note however, that there is little else that deals with 'women and water' as a major topic.

In terms of recognition, acceptance, and expectations, the history of 'women in development' is very similar to that of 'community participation'. First came the theoretical definition of the situation, then acceptance as a need at the policy level. Expectation that implementation would naturally follow the new policy definitions brought about a certain hiatus of movement.

For instance, in an East African country, a European based consulting firm designed a rural water supply project with specific inclusion of women in the implementation process. Women were added to previously all male committees for the construction and administration of the village water supply. During a later evaluation phase, project staff members commented quite plaintively on the lack of participation of women, even though their inclusion had been provided for in project design.[1]

Provision at the policy and design level is not sufficient. A 1978 World Bank publication on the socio-cultural aspects of water supply and sanitation recognizes this conundrum. It observed that the manner and method of identifying and recruiting participating populations was responsible for the quality and quantity of genuine participation.

> Recognition of local institutions around which participation can be mobilized is essential if communities are to genuinely participate in identifying resources and methods for project implementation. Committees locally selected according to custom (not necessarily by a democratic vote) should be involved in planning and organizing community participation. (author's italics)[2]

Community participation is a recognized factor in the success of development projects. Women's contribution to their communities have been recognized at international policy levels, and their continuing contribution to their families, communities, and nation, through active participation in development programs is now a recognized need and asset. However, if women are to successfully participate in their own community and national development, and thereby strengthen that process, their participation must be based upon their traditional strength and power as defined in their own cultures rather than an artificial tokenism expressly created for them from the outside.

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[1] Field communication, M. Dulansey.

[2] Elmendorf, Mary, and Patricia Buckles, Socio-Cultural Aspects of Water Supply and Excreta Disposal. The World Bank, September, 1978. This is the most comprehensive publication to date concerning social and technical factors of project planning and implementation.

Local Learning Systems: A Possible Answer

In this paper participation is defined as the learning process as communities deal with change and development. This is based upon Paulo Freire's definition of the learning process of reflection/action/reflection through dialogue.[1] Using this definition, it becomes clear that participation is the essence of the learning process, and control of the knowledge outcome of this learning process is the reason for community participation. This definition explains why it is so important to project success, and "what" community participation is all about.

The importance of the role of women in this community participation or learning process in rural water supply projects becomes apparent through field observation. In these projects the short-term goal of increased quantity and quality of water for the community, is dependent upon the community's willingness to use and maintain the new water supply. Women as the traditional water carriers and water managers play a powerful role in this situation, although it often goes unnoticed and unremarked by Westerners because of its indirectness. They decide whether to use the water source and whether it is worth the expenditure of effort to maintain or have it maintained.

The long-term goal of improved health of the family is dependent upon changing community perceptions of the relationships between water-borne diseases and the surrounding environment. But water mediates other profound and sensitive issues within the community that include those of social and religious significance. Thus, the needed changes in community perceptions cannot be effected by imported health education strategies, but rather must depend upon the utilization of the indigenous and local learning systems of the society. Women are most often the controller and purveyors in these systems. Because these are "local institutions" in which women have traditionally held power, they are a vehicle within which the inclusion of women as participators and even leaders is not artificial, but instead builds upon the traditional strength of women in the community.[2]

Local learning systems provide a common denominator for the enumerated factors that contribute to project success. Community participation is the learning process that takes place in local learning systems; technology use and maintenance is a function of decisions made in the traditional water technology local learning systems; health care perceptions and attitudes is a function of the knowledge transmission in the community health local learning

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[1] Freire, Paulo. Pedagogy of the Oppressed. Seabury Press, 1970.

[2] See Kulakow's "Mobilizing Rural Community Resources for Support and Development of Local Learning Systems in Developing Countries" for a description of how traditional communities are using this resource.

system; the inclusion of women as purveyors, teachers, leaders in local learning systems is an accepted role for women in almost any culture.

Therefore, a generalized conceptualization of the local learning systems that are present in every community is discussed and described in this paper as an operational framework that will integrate the technical factors of technology and water supply maintenance, with the social factors of community participation, motivation, and learning. This generalized conceptualization is actually a description of the components and process that any local learning system of water technology and management, or health, completes as it defines, decides, and possibly incorporates, new information or new technologies.

The specific local learning systems of every community is where knowledge formation and transmission, through dialogue and community participation take place culminating in learning, change, and development. Local learning systems is not a new definition, a new technique, nor is it an explanation of a new phenomena. These local learning systems have always existed in every community for the transmission of current knowledge and the management of new knowledge. These were the culturally specific informal education and cultural transmission systems identified by early anthropologists.[1]

The management of new knowledge, or at least outside requests to manage new knowledge has increased tremendously for most local learning systems and they have sometimes changed because of this pressure. Today, a specific local learning system may incorporate only the traditional informal system of education, or it may incorporate some nonformal systems. In some instances a community local learning system may also incorporate certain aspects of formal education systems that meet specific community needs.[2] But specific local learning systems remain, for all intents and pur-

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[1] See for instance, Fortes, 1938; Herskovitz, 1938; Mead, 1930, 1941.

[2] Formal Education: The highly institutionalized, chronologically graded and hierarchically structured "education system" spanning lower primary school and the upper reaches of the university;

Nonformal Education: Any organized, systematic educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population, adults as well as children;

Informal Education: The lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experience and exposure to the environment. (Coombs and Ahmed, 1974, p. 8)

poses, culture specific.

A generalized conceptualization of local learning systems is still possible however, and can functionally describe a culturally specific situation. It does so by capitalizing on the generalizations available from focusing on the subject and issue area of rural water supply itself, and secondly by capitalizing on the generalizations available from the description of learning as a process.[1]

In terms of the 'learning as a process' generalizations, this conceptualization, or "Local Learning System Operational Framework" is based upon the theoretical work of Paulo Freire and Ivan Illich.[2] The Western or westernized school system is Illich's focus. He contends that the lack of creativity therein is due to a tendency to "confuse teaching with learning, grade advancement with education, a diploma with competence, and fluency with the ability to say something new".[3]

Paulo Freire, on the other hand, concentrates on the informal education system of a village that is often characterized by decreasing cohesion and inability to deal positively with the increasing rate of change caused by the intrusive and powerful nature of modern technology.

> To help the peasant break away from the traditional fatalism and feelings of powerlessness, Freire emphasizes reflective thinking as the crux of the educational program. He then introduces the concept of praxis (reflection/action/reflection) as man's real function: men and women are not objects to be manipulated but are active, creative subjects with the capacity to examine critically, interact with, and transform their worlds.[4]

Both Illich and Freire are critical of the ability of informal or

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[1] For an overview of the people who have contributed to the theory of 'learning as a process', see Lyra Srinivasan's Perspectives on Nonformal Adult Learning, 1977. For a discussion of how the theory is relevant and should be implemented see Faure, et al, Learning to Be, 1972.

[2] Freire, Paulo. 1970, op. cit., and Education for Critical Consciousness, 1973. Illich, Ivan. Deschooling Society?? 1971.

[3] As quoted in Srinivasan, 1977, op. cit., p. 2.

[4] Ibid., p. 4.

formal systems of education to deal positively with change. This criticism is aimed at both ends of the societal spectrum--from the highly differentiated heterogenous technological societies to the homogenous, cohesive, 'folk village'. The theories of learning as process, or reflection/action/reflection through dialogue, provides a basis for explanation of how change and learning interact to produce development.[1]

The development of new technologies and its introduction to third world countries has made it even more necessary to understand these interactions and inter-relationships. Denis Goulet characterizes new technology as the "two edged sword" that is both "bearer and destroyer of values" for those communities where the local system of education and learning is still wholistic in approach.[2]

> How can groups experiencing modern technology for the first time quickly create a new synthesis of meaning and practical norms when advanced countries themselves, after two centuries of familiarity with techniques, have proved incapable of devising a wisdom to match their sciences...
>
> Societies initiating themselves to modern technology lack the long familiarity with science and technology which might enable them to make a new synthesis between these and their ancient wisdoms. And they have no realistic hope of preserving unity in their world of values by uncritically assimilating new techniques. Therefore, they are condemned to social disruption unless they can successfully involve their entire populace in decisions regarding tolerable value sacrifices to be made in accepting proposed change.

A community's ability to "involve their entire populace" places the emphasis on community participation as a learning process. The Local Learning System Operational Framework is discussed as

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[1]Several AID commissioned reports directly or indirectly deal with this interaction. They include: Non-Formal Education and the Structure of Culture, Michigan State University Program of Studies in Non-Formal Education, 1973; Axinn, George, Non-Formal Education and Rural Development, Michigan State University, 1976; Axinn, George, Toward a Study of Interaction in Non-formal Education, no date.

[2]Goulet, Denis. The Uncertain Promise: Value Conflicts in Technology Transfer, 1977, p. 22.

a 'possible answer' because it is an integrator of the social and technical aspects of rural water supply projects. and focuses on the interaction of learning, change, needed for adoption, steady use, and continuing maintenance of new water supplies.

Use of this framework as an integrator of the technical and social factors will clarify their interdependence in project design and implementation, and the importance of community participation for project success. The issues involved in the integration of social and technical aspects of rural water supply, and the important role of women are discussed in Section Three. The theoretical implications and practical application of the LLS Framework are discussed in Section Four. In Section Two present AID activities in rural water supply are outlined, and in Section Five, policy and program directions that will bring about further success in the positive integration of the social and technical factors of rural water supply are discussed.

If local learning systems can be utilized in the manner suggested in this paper, it obviously has a larger applicability than just rural water and sanitation development. However, because the relationships between certain groups of people, i.e. women, and certain tasks are directly observable, and these in turn are directly related to certain bodies of knowledge concerning water and health known to exist at the village level, a limited and concrete inquiry is created.

But in a more general sense, it is hoped that this discussion will contribute to a clearer definition of the relationship between learning and development, and the role that both women and men play. According to Kenneth Boulding it is the key element.

> The recognition that development, even economic development is essentially a knowledge process has been slowly penetrating the minds of economists, but we are still too much obsessed by mechanical models, capital income ratios, and even input-output tables, to the neglect of the study of the learning process which is the real key to development.[1]

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[1] Boulding, Kenneth. "The Economics of Knowledge and the Knowledge of Economics", Collected Papers, 1971, p. 372.

AID ACTIVITY IN WATER SUPPLY PROJECTS

How is AID Involved and What Has Been Learned

In 1978 potable water activities of the Agency was chosen as one of five evaluation topics in which all AID/W bureaus would cooperate. Under consideration were major commitments and expenditures to assist potable water development during the 1980's. The expressed reasons for the evaluation effort was so that "those designing new efforts can learn as much as possible from the significant number of failures and the interesting successes in the field".[1]

A part of this effort was an evaluation of AID files. The resulting publication, Patterns in Potable Water Projects, revealed numbers and statistics of general interest.[2] However, little information proved to be available concerning the issues of maintenance, community use, or socio-economic and health data. Of the 91 projects that were planned, active, or completed between 1960 and 1978, only 15 had specific evaluation studies completed.[3]

Analyses, literature surveys, and seminars concerning water supply projects took place in various bureaus during 1978-80. These activities did not produce a body of applicable knowledge relevant to the needs of project designers in the field. But it did produce a most important consensus of what are the important issues, and where Agency involvement is most appropriate. There is a basic commitment to:1) expanded rural water development; 2) more careful evaluation; 3) greater emphasis on software components; 4) and a greater emphasis on health education components.[4]

The draft Agency Water Supply and Sanitation Policy Paper states:

> AID will support comprehensive water supply and sanitation programs for the rural poor in developing countries. In urban and fringe areas, capital intensive and high technology water supply and waste treatment

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[1] Dworkin, D. AID Airgram, "Potable Water: Results of AID Workshop", 1978, p. 1.

[2] Patterns in Potable Water Projects: An Analysis of AID"s Automated Data, prepared by Practical Concepts Incorporated, 1978.

[3] Ibid., p. 1.

[4] Draft Agency Water Supply and Sanitation Policy paper, March 1980.

> will usually be left to other donors; in urban and fringe areas, AID will as a rule concentrate on the software components of water supply and sanitation programs.[1]

Interest in evaluation studies seem to have different emphases, depending upon whether the people involved are project oriented or policy oriented. Policy people have placed the emphasis on development of overall evaluation methodologies, while project oriented people are interested in 'does it work?, or doesn't it?' Integrating these two specific concerns will hopefully bring about more careful and explicit evaluation around the question, 'does the system work, and is it maintained five years after installation, or after project support has been withdrawn?' This is an obvious success criterion, but one that in the past has not been applied, especially in rural areas.[2]

Expanded commitment to the software component of greater community involvement and participation, although strengthened by equity concerns, women in development, and basic human needs policy efforts, is finally based upon the quest for success. The statement that support and maintenance of community water supplies, especially in rural areas, is not a technical question, but rather a social decision made by the community, has gathered increasing support by all groups concerned with community water supply. Increasing emphasis on the actual implementation of 'software components' is therefore expected.

There is then consensus, direction, and strategies. Rural water supply projects at the PP level often contain both evaluation and community involvement strategies. For project evaluation, workable implementation methodologies have begun to be developed.[3] For community involvement however, there are few, if any, recognized implementation methodologies.[4] The literature and project design papers are filled with statements that conclude that local participation must be real rather than theoretical, and the margins are replete with pencilled in comments of "how".

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[1] Draft Water Supply and Sanitation Policy paper, op. cit., p. 12.

[2] Burton, Ian, 1979, op. cit., pp. 18-19.

[3] Ibid., pp. 14-19.

[4] See Self, Social Analysis of Rural Potable Water Programs (1979) for a description of the role of village participation on motivation for project maintenance and a summarization of factors favorable to community participation, pp. 7-9.

International Donor Activities and Research

Because of the International Drinking Water Supply and Sanitation Decade there has been increased activity and research by all international donor organizations. The activities of the Decade are guided by a steering committee of seven different U.N. agencies and is chaired by the UNDP.[1] Fifty countries have already prepared national strategy reports for the Decade and have forwarded them to the U.N. and UNDP coordinator Peter Bourne. The U.N. estimates that $92 billion will be needed on a global basis to meet the water supply goals by 1990, and another $40 billion will be needed to meet the stated goals of sanitation. The developing countries themselves will have to supply 70 percent of these funds, with 30 percent of the funds coming from international donor agencies.

The World Bank has given high priority to the Decade. In 1979, nine percent of the Bank's total program was for water and sanitation, and it is projected that the Bank will maintain the funding for the water and sanitation program at $1 billion per year throughout the Decade. It is interesting to note that funding for water and sanitation programs from 1963 to 1978 totalled $1 billion at the Bank, while in 1978-79 funding also totaled $1 billion, a good measurement of the Bank's priorities.

In other U.N. agencies, the WHO Director has indicated full support for the Decade and sees it as an integral part of "Health for all by the Year 2000". UNICEF is currently spending 25 percent of its budget on water and sanitation projects, and in research and project implementation is emphasizing a "software orientation".

In research activities, interest has coalesced around four major issues. They include: 1) evaluation; 2) community participation; 3) health; and 4) appropriate technology. There are presently seven studies either ongoing or recently completed.[2] The OECD project concerned with research experience in rural drinking water projects,[3] the IRC/Ross Institute project on methods for evaluation

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[1] Information concerning the U.N. agency activity was received from Ambassador John McDonald, then U.S. coordinator for the Decade, and Dr. John Kalmerbatten, Director of the World Bank's Energy, Water and Telecommunications Department.

[2] See Anne Whyte (1979) op. cit. for a complete analysis and description of these seven research projects.

[3] "Planning and Design of Rural Drinking Water Projects: a research framework to analyze experience with rural drinking water schemes", Nicolas Imboden, Sept. 1977. This is an excellent starting point for anyone wishing to review RWS evaluation methodology.

of village water supply,[1] and the UNICEF field evaluations of water schemes in India,[2] primarily focus on evaluation methodologies. A UNICEF/WHO joint committee on health policy focuses on water supply and sanitation as a component of primary health care.[3] The World Bank study of rural water supply in eight developing countries is described as a generalized 'observation investigation', and focuses on affordable appropriate technologies through an eclectic research design.[4]

Although all of these studies consider community participation an element to be considered, the World Bank study is the only one in which substantive research has been carried out. It includes publications enquiring into the correct social techniques that stimulate community participation at the field level,[5] and definition and analysis of 'social information' needed at the project design level to ensure valid community participation.[6]

The seventh study and the only one to focus specifically on community participation is the International Reference Center (IRC) project on extension and community participation in water supply and sanitation.[7] The IRC project is designed to accomplish three objectives.

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[1] "Evaluation for Village Water Supply Planning", Carincross, S., Carruthers, I., Feachem, R., Curtis, D.C., and Bradley, D., 1978 draft.

[2] Phase I (1974-76) overview of UNICEF assisted projects in RWS in India starting with Tamil Nadu project. Phase II is designed to study issues concerning community acceptance and participation, and impact on health.

[3] "Water Supply and Sanitation Components of Primary Health Care". Consultant draft report submitted to Meeting of Temporary Advisors, WHO, Geneva, June, 1978.

[4] "Eight Case Studies of Rural and Urban Fringe Areas in Latin America", May 1979. This paper is only one of a series issued by the Energy, Water, and Telecommunications Department. The entire series is one of the most comprehensive efforts to date.

[5] Elmendorf and Buckles, 1978, op. cit.

[6] "Social and Behavioral Aspects of Water Supply and Waste Disposal Project Work", June, 1979. In terms of AID project design it is also interesting to review Perrett's, "Social Analysis and Project Design in the Agency for International Development", 1978, for social analysis guidelines.

[7] Whyte, Anne, 1979 op. cit.

It includes review of current work and programs; developing guidelines, based on community participation, for improved extension; and formulation of an action plan for furthering international efforts in this field.

The literature review prepared by for the IRC, Participation and Education in Community Water Supply and Sanitation Programs, was completed in March of 1979 and gathers together all of the literature in this inter-disciplinary field.[1] The body of the book offers a review of the existing literature, thereby reviewing to some extent, relevant field experience, while the introduction puts together a synthesis review. It thus accomplishes the first IRC objective.

Continuing work towards the second objective includes development of a set of guidelines for extension workers in community participation, which was developed in conjunction with the 'slow sand filtration project'. Written by Alistair White and revised by Hermione Lovel, the report provides an overview and checklists for extension workers, but tends to be generalist in nature.[2]

An 'appraisal study' that begins formulation of action plans so that the IRC project development of theory and strategies can be translated into community implementation plans was written by Anne Whyte.[3] She concludes that "how to do it" is the most neglected and the most urgent question.

The consensus of direction and strategy on the international multilateral aid scene is similar to that of the Agency's. The needs, in terms of better evaluation and better community participation form a congruent and coherent multi-national objective.

AID Involvement in the U.N. Declared Water Decade of 1981-90

In 1978 AID projected its support for the U.N. International Drinking Water Supply and Sanitation Decade, over the coming ten years, at about $2.5 billion. Presently because 1980's financial environment is so bleak in terms of foreign aid, and because the $2.5 billion was understood to mean new and increased funding, there has been a retrenchment of that goal. Although the Decade is to be supported,

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[1] Participation and Education in Community Water Supply and Sanitation Programs, 1979, op. cit.

[2] White, Alistair (1978) and Lovel, Hermione, (1978) as quoted in Whyte, Anne (1979) op. cit.

[3] Ibid., included in Annex A is 'Summary of Hypotheses about Community Participation in Rural Water and Sanitation', taken from Whyte (1979).

in terms of Agency priorities there seems to be a majority consensus that "water" does not rank with the other enumerated priorities of energy, health, food, and population. There is, however, a strong minority opinion that "water" is competing with health projects for funding, and deserves to be taken from under that umbrella and a separate office be created for its administration. It is felt by this group that "water" is a far larger development issue than health because it is considered to be a basic building block for all development efforts.

At this point the U.S. expresses full support for the Decade and there is definitely preparation and planning for it within AID.[1] But it will most likely not reach the earlier planned or hoped for goal. Present project support and funding seems to bear out the diminished funding point of view. In 1979, AID planned 70 water supply and sanitation projects in 33 countries, and in 1980 activities are programmed for 44 countries. Total AID funding for water and sanitation projects in 1979 was $158,035 and $170,537 in 1980. However, in 1981 total funding will be $146,900, a fairly significant decrease in funding that in 1978 was envisioned as substantially increasing through the early years of the Decade.[2]

In summary, although retrenchment of financial assistance seems to be a certainty, USAID in terms of its emphasis on rural water supply and software components has in principle, addressed itself to the most difficult area and most complex subject of the Drinking Water Decade. If committed Bureau staff people can negotiate the difficult shoals of financial constraints[3] and place their diverse resources squarely on implementation, in all its complexity, the goal of truly aiding national governments in attaining Decade goals may indeed become a reality.

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[1] The WASH RFP and its imminent funding as a four to five year project is indicative of AID preparation for Decade activities.

[2] Figures obtained from Ambassador John McDonald, U.S. coordinator for the Drinking Water Decade.

[3] One of the most difficult aspects of these financial constraints is the tendency, despite policy emphasis of software components, to allocate a greater percentage of the financial resources to tangible installations, disregarding the known social and behavioral risk factors. For an excellent analysis of how equal emphasis and integration of the technical and social factors may actually accelerate construction, see Burton, (1979) op. cit., pp. 29-30.

THE SOFTWARE ISSUES OF RURAL WATER SUPPLY

Goals, Objectives, and Expectations

There is a series of interlocking steps and patterns in all development activities. The same pattern is found at each level or step, and each reinforces the others. In considering the largest sphere, the context and objectives of international development have changed radically in the past fifteen years. The capital intensive technology tied to 'trickle down' theories of development have given way to appropriate technologies tied to equitable distribution of goods and popular participation in self development.[1]

In the United States' sphere, the "New Directions" strategies legislated by the 1973 United States Congress directed AID to make its programs more responsive to the poor majority in recipient countries, improving their access to resources and services so that the poor could "better their lives through their own effort".[2] At the same time, new objectives of effective local participation in development projects brought about new expectations of more equitable distribution of goods for all people. Effective local participation 'for all people' was further defined as 50 percent female through the recognition of 'women in development'.

The objective of this report, congruent to the interlocking steps and patterns of the larger development arena is to describe at a more specific level and in the interests of more successful rural water projects, what community participation is, how to accomplish it in these projects, and how women can be effectively included in this participation. The most basic issue is, of course, success or failure of the rural water supply project. Woman's role, both as she affects the project, and as the project affects her, has not been adequately defined.

Rural Water Supply and the Concerns of Women

Until 1972 water supply construction and technology were the major emphases in any water project. The publication, in that year, of

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[1] See Rogers, "Communication and Development: the passing of a Paradigm", 1976, Communications Research, vol. 3, no. 2, 1976, pp. 213-240.

[2] See Section 102(b), (c), (d), of the FAA, as quoted in AID Agricultural Development Policy Paper, June, 1978, p. 6.

Drawers of Water: Domestic Water Use in East Africa[1] described and defined the entire gamut of issues that were to be given importance in the coming decade. The issues included water use, the social cost of obtaining it, health of the user and the quantity vs. quality quandary, and user choice of water sources. The definition of these issues for the first time outlined the role of women in water supply projects.

Before 1972, during the time of construction and technology emphasis in water supply, water quality was considered to be the most important component because of its perceived relationship to better health. The convenience brought about through improved access and reliability were secondary, as were the possible health benefits of greater quantities of water. Women as passive beneficiaries of the project, and their assent, along with the reliability of the technology, was assumed.

The realization that the reliability of the water system could not be assumed, and in fact rural water installations were failing at an appalling rate made its way from the field level to the international level via documentation by White et al (1972)[2] and Saunders (1976).[3] This in turn led to new priorities and the formulating of major resolutions at the 1976 U.N. Habitat Conference in Vancouver, and the U.N. Water Conference in Mar del Plata. From that point forward, the provision of reliability, improved access, and increased water quantity would be regarded at least as important, in terms of project success, as the point installation of a water system that would provide potable water. These changing priorities have increasingly emphasized the role of women in rural water supply and sanitation, but this inter-relationship has not been adequately explored and acknowledged. The four major issues that are relevant to women's needs and power structure are briefly discussed below.

The Convenience Factor

Access and reliability of the water source are key factors as women

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[1] White, Gilbert F., David J. Bradley, and Anne U. White, Drawers of Water: Domestic Water Use in East Africa, 1972, University of Chicago Press. This is a bench mark publication, and its elucidation of issues is as relevant today as at its publication date.

[2] White, et al, Ibid.

[3] Saunders, Robert and Jeremy Warford, Village Water Supply: Economics and Policy in the Developing World, John Hopkins University Press, 1976, Baltimore.

decide whether they will use the water source. Report after report has stated that given several choices, including traditional sources and improved sources, the closest source is almost always chosen.[1] In many areas this means that the improved source may well be used by all during the dry season, but those farther from the source improved will go back to seasonal traditional sources that are closer during the wet season. This decision is not hard to understand, if it is recognized that women are not only the water carriers but also the water managers. In less developed countries, human energy is finite and stretched to the breaking point. For women the demanding workload seems almost infinite, and the fact that convenience is a major factor in decisions of use should come as no surprise.

The World Bank has recently recommended that projects that must compete with seasonal traditional sources that are more convenient than the envisioned new installation be given a low priority. Thus access, as it applies to convenience, is now a recognized major factor that determines project success through use and maintenance. The role of women as water managers concerned with efficient use of time is obvious but was not specifically commented by the Bank publication.

Health and Quantity vs. Quality

Until the middle 1970's the criterion of convenience was consistently over-ruled by water quality criteria in the name of health. It was believed that strict attention to water quality was necessary to achieve the health benefits that were known to aggregate around pure or potable water. However, research published in the 1970's brought to issue the one-sided emphasis on water quality as opposed to that of water quantity. Feachem (1978) and Brisco (1977) found little proof for the long held assumption that diarrheal disease was transmitted primarily through the water source. On the other hand, large numbers of studies reviewed by White et al (1972) and Saunders (1976) showed diarrheal disease decreases with increase in availability of water.[2] Feachem states that non-water borne diarrhea, skin and eye infections, which are all major causes of morbidity, "are reduced by increasing the quantity, availability, and reliability of the

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[1] See White, op. cit.; Carol Ayad, "Social Soundness Analysis of Potable Water Interventions in the Central Tunisia Rural Development Project Zone, AID, 1978; Grace Hemmings, Tangaye Water Study, AID, 1978; Paula Roark, "Social Soundness Analysis of the Upper Volta Village Water Supply Design Project", AID, 1978.

[2] See George Self's "Social Analysis of Rural Potable Water Programs", AID, 1979, for a helpful integration of current research on the relationship between water supply, sanitation, and health.

water supply almost irrespective of its quality". He then postulates:

> Therefore a general rule can be postulated that all low-income water supplies should strive to bring abundant quantities of water near to or into dwellings throughout the year.[1]

The importance of this statement is borne out by two facts. Adequate amounts of water for effective control of water washed diseases ranges from 20 to 80 liters of water per capita per day.[2] Rural people without tap connections or standpipes use anywhere from a little over a liter to 25 liters.[3] However, for those people that live more than a kilometer from the water source, daily use is usually about 10 liters per capita, while those more than 5 kilometers away exist on about 5 liters of water per day.[4] Access, then, is a key factor for possible health benefits.

There are several interesting studies currently being carried out concerning quantity/quality of water and its relationship to health.[5] One of the more interesting is taking place near Hyderbad in India. Three paired villages in three agro-climatic zones of the semi-arid tropics have been studied, extensively, for agricultural and socio-economic information, with no interventions, since 1975. Water samples of the wells in all three villages were taken and were shown to be contaminated to the highest measurable level with 'e coli'. Subsequent parasite studies of the village populations, consisting of stool samples from adult head of households and children showed however, that the rate of parasite infection in each village population follows the agro-climatic zones. In other words, the village in the A Kola district with 35 wells per village and an assured annual rainfall of 900-1000 had the lowest rate--25 percent--of parasite

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[1] Feachem, R. G., "Water Supplies for Low-Income Communities: Resource Allocation, Planning, and Design for a Crisis Situation", in Water, Wastes, and Health in Hot Climates, Feachem, McGarry, Mara, eds. John Wiley and Sons, London, 1977, p. 86.

[2] White, et al, op. cit., 1972.

[3] White, Anne U., "Patterns of Domestic Water Use in Low-Income Countries", in Feachem, McGarry, Mara, eds., op. cit., p. 96.

[4] See Ayad, 1978, op. cit.; Hemmings, 1978, op. cit.; Roark, 1978; op. cit.

[5] See AID Evaluation Study of Guatemala, by Daniel Dworkin, June, 1980.

infection. The village in the southern Mahahrastra district with four wells and a non-assured rainfall had the highest rate of parasite infection, with 75 percent to 85 percent of the village population suffering from parasites. The village with intermediate rainfall and 15 wells in the village had a parasite infection rate of about 50 percent of the population.[1]

ICRASAT Research Scholar, Patricia Bidinger, is presently in the process of developing a research program to evaluate causal hypotheses. Of course, the over-riding hypothesis is water quantity, but there are other interesting factors that would further elucidate the relationships. They include: number of trips to the well and subsequent storage; type of storage receptacle; and finally, the fact that the most northern village, where the lowest levels of parasite infection are found, also has a guru that incessently asks people to wash their hands.

More attention is also being paid to the fact that water, potable at source, is not necessarily so by the time it is drunk. Observations at well sites yield the following types of information.

> The Ghanian woman approaches the well from the river path. She has obviously decided to travel the extra 1/4 kilometer for water from the CIDA[2] small bore well rather than stopping at the ponds that are just now beginning to hold water at the beginning of the rainy season. She shakes hands with the foreigner sitting under the tree while still holding the empty metal pail on her head. She then takes her pail to a trough of runoff water and swishes the pail out with her hands. She puts the pail down beside her on the red sandy mud and talks to neighbors while she awaits her turn. A child painstakenly dribbles equal amounts of sand into each of the three waiting buckets. In turn she fills her pail and sets it down to finish the conversation. A village dog arrives and drinks unnoticed from the bucket; the child then carefully adds more sand, and then finished with the job, rinses his hands.
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> Just as she is about to leave, an old man walks by. The woman hails him and offers him a drink. The man willingly obliges and scoops up several handfuls. The dog decides to try again but is noticed

[1] Field Communication, Patricia Bidinger, Research Scholar, ICRASAT, Hyderbad, India, May 1980.

[2] CIDA--"Canadian International Development Agency."

> this time by the old man and is shooed away. With a quick smile to the foreigner, she places the pail on her head, smooths her pagne, and slowly moves down the path to her compound, 1/2 kilometer distant.[1]

Recognition of the prevalence of these types of situations has led to an increased emphasis of health education components in many RWS projects. Emphasis of the faecal-oral process that transmits diarrheal diseases and is decreased by greater quantities of water, irrespective of quality has increased, while explanation of the germ theory that accompanied water supply projects emphasizing water quality has decreased. The World Bank for instance has developed a diagram that describes 'behavioral loopholes in the water-use process', or practices in water use that allow for contamination.[2]

Despite these changes in orientation, the emphasis of project health education components still focuses on water quality. Therefore, the advantages of increased water quantity is rarely mentioned to communities as they consider new water supplies. For a village that must decide between increasing hand dug wells or relying on hand pumps dependent upon regional maintenance teams, this is a valid and important piece of information. Exterior emphasis then, on certain types of health information and objective, limits community choices as to the ideal mix-for-them of quantity, quality, access, and reliability that a specific water technology can offer.[3]

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[1] Field observation, team visit to CIDA rural water supply project in northern Ghana, July, 1978, Paula Roark, Social Analyst, Upper Volta Village Water Supply Project Design Team.

[2] Perrett, Heli, "Social and Behavioral Aspects of Water Supply and Waste Disposal Project Work", draft, June 1979-Jan., 1980, World Bank publication, Diagram 1.

[3] This situation also tends to remove women from active participation and responsibility in areas where they have traditionally been most strong. In Perdita Huston's Third World Women Speak Out, 1979, she documents interviews throughout the world where women categorically state that they are most interested in knowledge and skills pertinent to nutrition, hygiene, cultivation, and health care. Anne White (1977), op. cit. documents that "there is considerable evidence that a woman in selecting her source picks what she considers the best quality for her family". Anne Whyte of Toronto, in "Towards a User-Choice Philosophy in Rural Water Supply Programs", Carnets de l'Enfance, vol. no. 34 argues that it is just this mix of quality factors, quantity factors, social cost and energy factors, that has already established a user choice hierarchy in the traditional water system.

Maintenance

When it became apparent that Murphy's law not only applied to rural water supply projects, but that it was even especially applicable, maintenance was recognized as the all important variable in the success of rural water schemes. Maintenance failure is many faceted, but can be basically classified into three factors--technology, capacity, and motivation.[1]

The concept of a correct technological "fit" between community and technical equipment used to provide water is the simple side of the maintenance spectrum. Every so often when a water supply installation fails the problem may well be a straightforward case of inappropriate technology. However, in rural water supply the technology itself is rather simple, so most of the problems of maintenance revolve around such questions as: there are no spare parts; the regional repair person hasn't come in two months because his Landrover is broken down or doesn't have gas; the water tastes salty; the motion of the pump is too tiring for people to operate; the pump is sited in an area where spirits or genies are known to gather. All of these are questions of 'capacity'and 'motivation'.

> --The word "capacity" is used here to cover a number of shortcomings and deficiencies in national rural water supply programs which result in a reduced capacity or incapacity to undertake the maintenance function adequately.
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> --More could be done effectively if the ingredient of "motivation" were more prevalent at the community level. By "motivation" in this context, we have in mind a series by social considerations which adversely affect the performance of rural water supply systems.[2]

These then are the complex factors of the maintenance spectrum. The extent of women's input into these factors are only now being recognized. This input in the area of motivation is in actuality a broad outline of the subject of this paper, and is discussed throughout. However, there are several issues, specifically in terms of technology and how it relates to capacity and motivation, that are especially relevant to women and their responsibilities.

Women have been, in most instances, effectively barred from the

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[1] Burton, Ian, 1979, op. cit., pp. 19-26.

[2] Ibid., p. 19 and p. 24.

planning, design, and implementation transactions that concern technical design or maintenance of a project. This situation has been rationalized by alluding to the cultural inappropriateness of including women in this type of work. In reality, however, it is a synergetic relationship between the weakened but continuing Western concept that man's work is technical work on the one side, and the developing country's attitude that 'men's work' and 'women's work' although similar, if not the same, in the nature of the task, are actually separated in terms of workforce. This gives a situation where project design teams assume that women have not been included in planning and design meetings because they traditionally have no role or responsibility in the matter at hand. Men from the developing country, on the other hand, will not wish to include women, nor will women wish to be included because of the culturally traditional sex separated work force.

But women have traditionally played a strong role in traditional technology decisions. In most West African countries the women construct small temporary water source structures during the rainy season that are closer to their homes than the dry season source.[1] In northern Ghana and southern Upper Volta, it is the women who decide when a new permanent water source is needed, and then they approach the men to decide together how it can be accomplished. In another Voltan ethnic group the women play a symbolic role in their group's efforts to attain sufficient rain from the rain gods.[2]

Translation of this traditional responsibility into roles as supervisors and planners in current projects is certainly the exception. In Bolivia, young women are in complete charge of repair and maintenance of water and sanitation facilities.[3] In Peru, women are laying pipe as construction workers for their community systems, and in some areas are involved in leadership roles.[4] In East Africa, women have in some instances been involved in planning and design.[5] However, as Elmendorf points out, women-oriented

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[1] Field communication, Josephine Gissou, Voltan sociologist, 1978.

[2] See Social Analysis, Upper Volta Village Water Project, Roark, op. cit., 1978.

[3] Elmendorf, Mary, "Women, Water and Waste: Beyond Access", 1980, p. 11.

[4] Personal communication, Bucky Northrup, Program Officer, Latin America, CARE.

[5] See Whiting, M. and Krystall, A., "The Impact of Rural Water Supply Projects on Women", CARE, Nairobi, no date.

projects, although easily replicable, have not become the model. She states: "Usually women-oriented projects last through one administration at most. Others dwindle as private agencies change focus".[1]

If these types of projects, where there is essentially a co-responsibility between men and women reminiscent of traditional work divisions, have not flourished, the question must be asked why. The answer is found, at least partially, in the modern maintenance sector and its diversive strength.

The maintenance sector has been strengthened both by sanitary engineers, often in the past proponents of high technology, and the newer wave of experts who advocated 'appropriate technology'. Sanitary engineers saw as their first objective the provision of potable or high quality water. To achieve this objective in rural areas, they were dependent upon the simple technology of handpumps. The possibility of maintenance failure, therefore, was not relevant to them, the emphasis was on site construction, and capacity was overlooked.

The proponents of 'appropriate technology' focused on maintenance failure in their designs of "easily installed and easily maintained" water installations. But they seemed to forget if there are no spare parts there is no repair. Once again, in the name of an admirable objective, the real capacity of the government was overlooked, and the importance of the reliability of a village water source was underestimated. Literally and figuratively, women were left in the middle holding the bucket.

Reliability of the water source is essential to life. As long as the maintenance sector can afford to ignore the necessity for reliability of each specific water source, they can also ignore the needed role of women in maintenance. But if the maintenance of the new improved water source is not sufficient to provide that reliability, the users will return to the traditional sources. If women are not included in the planning and implementation of a modern water source, as they have been in the past for traditional water sources, their motivation to use the new source will be limited. If the maintenance is given over to an untested and uncontrolled agent, from the village point of view, should women

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[1] Elmendorf, Mary, op. cit., 1980, p. 11.

take a chance and go along? Many village women (and men) think not.[1/2]

The Scope and Substance of Community Participation

The definition of community participation, how it is related to project success, and why women must be included to achieve this success, is the central question of this paper. In this subsection the historical progression of community participation as an element of development will be briefly traced. Its relationship to project success will be discussed and its relationship to development ideologies will be examined. Finally, participation, defined as the learning process by which communities deal with change and development, will be described as an integrative framework for the social and technical factors of rural water supply projects.

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[1] This point of view concerning necessity for water source reliability was expressed to the author in many villages in Upper Volta, and several in Ghana. Because the other issues discussed in this section are not bound to a specific geographical area, this issue is also expressed as a general concern. It is left to the reader's judgement how well this applies in areas they are familiar with.

[2] Two issues that are important to women but are beyond the scope of this paper have not been included.

The first issue is that of economic or monetary return from freed time that women experience as a result of improved access and reliability of improved water supply. These figures--and they do exist--are based on assumptions that have not been proven or observed. They are essentially figments of the imagination of those who must prepare cost benefit analyses in support of rural water supply projects. The best analysis, incorporating what other work has been done and based upon real figures and complete evaluation is Dennis Warner's Evaluation of the Development Impact of Rural Water Supply Projects in East African Villages, Chapter six, "Productivity Benefits", 1973.

The second issue is cost benefit analysis as it applies to evaluation of capital intensive technology and labor intensive technology. David French in "The Economics of Renewable Energy Systems for Developing Countries", 1979, points out the importance of choosing the correct level of discount rate for correct analysis (p. 41). He concludes, "the principle holds that low interest rates in themselves are the friend more of sophisticated (Continued next page)

For a number of years development workers have reported observations of community participation that seemed to bear directly on the success of the project. In a 1964 AID report from Thailand the following observations concerning the success of a potable water project and unsolicited community participation are reported.

> One interesting by-product accomplishment has been the involvement of the village community development committee in the process of soliciting village support in the initial phases of the potable water system, and their involvement in the management of system following construction. The direct involvement of these committees is apparent in all too few villages, but where the committees are involved, the systems are generally better managed than when they are inactive.[1]

During the next decade a variety of studies began to prove that there was a strong correlation between measured project success, both in terms of productivity and social welfare, and effective local participation.[2] Each of these studies however, emphasized a different context and facet of local participation. At this point, there seems to be agreement that community participation is essential to project success, but there is still no agreed upon definition from which to proceed. A Cornell University report, prepared for AID, describes the dilemna.

> After undertaking many hours of discussion and a thorough review of relevant literature in economics, sociology, and political science over the past ten years, we are properly impressed with the complexity of "participation" as a concept and we can understand better why so much confusion surrounds the use of the term. It is no wonder that practitioners find it difficult to promote or even report on "participation" when academics disagree so on the scope and substance of the term.[3]

(Cont.) technologies than of simple ones". Project decisions between modern hand dug wells and small bore hand pump, based on cost benefit analysis must be aware of these implications.

[1] Engineering consultant report, Thailand, USAID, 1964.

[2] See citation number one, page three of this report.

[3] Cohen, John, and Norman Uphoff. Rural Development Participation: Concepts for Measuring Participation for Project Design, Implementation, and Evaluation, Cornell University Rural Development Committee, 1976, USAID Report, Technical Assistance Bureau, p. 1.

Definitions of discussion of community participation in all of these disciplines have centered around either technique or philosophy. Participation and its philosophical implications for development was first discussed as a separate topic at the 24th session of the United Nations Economic and Social Council's Commission for Social Development in January of 1975.[1] The report concluded that although there was no specifically accepted definition of popular participation, it does refer to three distinct, but closely related factors in the development process. It includes: mass sharing of the benefits of development; mass contribution to development; and mass involvement in the decision making process for development.[2] It is the second and third factors that will be more completely examined in the following discussion.

Technique as Definition

The techniques of participation have been clearly defined and because of this, have often been used as a definition of participation per se. These techniques fall into two groups. The most widely known and accepted are those of identification of local leadership and decision making strategies. In essence, 'local leadership' techniques consist of identifying leaders of the community and enlisting their aid in design and implementation of a project, with the hope that the local people will see fit to support the identified leader in his new endeavor. Decision-making strategies usually focus on the interaction between the local leader and community people as decisions are made whether to support the project.[3]

The emphasis on local participation in adult nonformal education components of integrated rural development projects in the 1960's and 1970's led to development of new techniques, and was based upon the view that the local participants were active agents rather than passive recipients.[4] The community participation technique of

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[1] U.N. Economic and Social Council. "Popular Participation and Its Implications for Development", Progress Report of the Secretary General, Commission for Social Development, January,1975.

[2] Ibid., p. 4.

[3] See Popular Participation in Development: Emerging Trends in Community Development, U.N., Department of Economic and Social Affairs, 1971, pp. 1-22, for a discussion of past, present, and possible future trends in 'community development' and participation.

[4] See Srinivasan, 1977, op. cit., for a discussion of the learning processes of nonformal education and their major theoretical proponents.

'problem posing' introduces the process of praxis-reflection/action/reflection--through which local people become aware of their own power, and look critically at their own community situation. They then take steps to change that which is judged negative.[1]

At one end of the spectrum then, community participation is precisely defined as technique, while at the other end community participation is generally defined as the development goal or philosophy. In actuality, community participation is both technique and development philosophy, but neither definition is helpful in identifying the crucial relationship that the correlation between project success and effective local participation indicates exists.

Definition and Ideology of Participation

In the AID funded report, "Rural Development Participation"[2] an

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[1]Paulo Freire, 1970, op. cit., develops the theory of praxis as learning process. Goulet, 1977, op. cit. calls our attention to the difference between technocratic 'problem solving'and Freire's 'problematizing'. He states: "But the problem solving stance favored by technology differs totally from the revolutionary "problematizing" stance. This important difference is repeatedly invoked in the writings of the Brazilian educator Paulo Freire. According to Freire, one can know truly only to the extent that one 'problematizes" the natural, cultural, and historical reality in which one is immersed. And how does "problematizing" differ from technocratic "problem-solving"? In problem solving, an expert steps back some distance from reality, breaks it into and analyzes its component parts, devises means for solving difficulties in the most efficient way, and then dictates a strategy or policy. This approach Freire contends, distorts the organic totality of human experience by reducing it solely to those dimensions which can be treated as mere difficulties to be removed.

To problematize, on the contrary, is to engage an entire populace in the task of codifying its total reality into symbols capable of generating critical consciousness and empowering them to alter their relations with nature and social forces. Problemsolvers who break reality down into parts remain outside viewers of that reality and are unable to grasp the totality surrounding them. But problematizers see themselves as part of that totality; in addition that totality is itself subject to the influence of their own actions once they gain a new critical understanding of it." p. 19.

[2]Cohen and Uphoff, 1976, op. cit.

attempt was made to objectively define the local participation process. This analysis of what components exist as participation takes place is informative and useful because it does not fall back on technique definition, nor does it generalize itself into a statement of philosophy. Their approach is to establish and assess measurement and evaluation indicators. The 'basis', 'form', 'extent', and 'effectiveness' of participation are the proposed indicators.

The basis for participation is described through analysis of the impetus and motivation for participation. Impetus is characterized as either coming from the bottom up, or from the top down, while motivation is seen as a continuum from voluntary to coercion. The bottoms-up participation is seen as more likely to be voluntary, while the top-down participation is more likely to have elements of coercion.

The form of participation has two dimensions: 1) the extent participation occurs at the group level, or the individual level; and 2) the degree of organizational complexity. The extent of participation depends upon the intensity of involvement as measured by time spent, and number and range of activities. The effectiveness of participation is measured by the degree of power that project participants have to make their participation effective.[1]

Explanation of the 'basis' of participation in terms of impetus and motivation identifies a crucial interaction among philosophy, technique, and methodology that has contributed to the "complexity of participation as a concept". The fact that impetus is defined as having two directions--from the bottom up, or from the top-down--encompasses the ideological arguments concerning both technique and philosophy of participation.

Local leadership techniques use 'from the top down' directions and were first seen in the early community development strategies of the 1950's. Here the development objective was on aggregate economic objectives, and the development philosophy or ideology emphasized local "input" rather than local "control". On the other hand, the problem posing and participatory research techniques use 'from the bottom up' directions to achieve greater distributional justice or social equity through local control and capability. Thus choice of participation techniques were often dictated by the overall development philosophy of the project staff or organization, rather than the needs of a particular project.

Because of this direct relationship between development philosophy

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[1] Ibid., Chapter four, pp. 1-20.

and choice of participation technique, the objective description of participation methodologies is made even more difficult. Moreover, the difficulty in arriving at objective descriptions of participation methodologies has been almost totally attributed to the problem of cultural specific demands of participation. This is most certainly a factor to be reckoned with. But the intertwining of development philosophy and choice of participation technique is also a major factor that has contributed to these difficulties of definition, and one that has not been recognized. This factor is illustrated in field observation of rural water supply projects.

Service Projects or Development Projects

Rural water supply projects have divided into two camps of development ideology, based upon the project staff perceptions of the objective of the project—service or development. Service projects can be defined as those which involve no social change of the community in order to receive the project outcome, and the people have essentially given their consent. Service projects call for only minimal participation techniques of local leadership promotion for success. Development projects however, are defined as those which demand social change in the community to receive the project outcome or reward. Development projects call for the major community participation strategies of problem posing and participatory research to define the needed social change, and community decisions whether to make those changes.

Service projects in rural water supply have successfully used local leadership techniques to promote community participation in the financing and construction of water supply. This strategy has been most successfully used in South America.

> Once the community has been selected, the program promoters assist the community leaders to organize and conduct their campaign to elect and establish a local water board. Its responsibility is to obtain a community contribution of labor and/or cash which will serve to reduce construction costs, and to organize and supervise the community's efforts to build the system which has been designed by the national/regional program.[1]

Development rural water projects, by definition, have dealt with larger and more encompassing objectives. Whyte points out that "we are not only concerned with water as a commodity but as a focus for a whole set of beliefs, values and rules. In bringing a rural water

[1] Donaldson, David, op. cit., 1976, p. 49.

project to an area, we are bringing not just new techniques, but new concepts about the relation of water to health and disease and new formats for organizing the community."[1]

Again, in South America the community participation techniques of problem posing and participatory research have been successfully used.

> Local people, leaders, and students were active participants in identifying community problems through structured and unstructured interviewing, observing, and listening in Chan Kom... Through this use of such a technique, the "researched" became "researchers". When this kind of problem solving approach accompanies the introduction of a technology, a dialogue is established between the potential users of the technology and the agency facilitators or social scientists involved in project promotion. Community participation becomes an active concept in which instead of being "targets" of a delivery system, people take part in the change process.[2]

User perception of the project is the correct criteria for classification of a rural water project as "service" or "development", and not as has often been the case in the past, project staff or organization development ideology. The rigid inflexibility of development ideologies has contributed to the non-success of many projects. The person totally committed to a "top-down" development ideology, stereotypically cast as an engineer, will decide that it is a service project: "more water is better, therefore, we are obviously providing the community with a desired service". The person totally committed to a "bottom up" ideology, stereotypically cast as a social scientist, will decide that it is a development project: "more water is a change, therefore, we are obviously dealing with a development project..." The point is of course, that each side can point to their own group of project successes and claim that they are right, thereby totally losing focus on what should be the central issue for project success--user perception.

Community Participation as the Learning Process

When community participation is defined as the learning process by

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[1] Whyte, Anne, "Towards a User-Choice Philosophy in Rural Water Supply Programs", Carnets de l'enfance. Vol. 34, April-June, 1976.

[2] Elmendorf, Mary, and Patricia Buckles, op. cit., 1978, pp. 45-46.

which communities deal with change and development, the necessity to measure this change from the point of view of the potential user is further understood. Using Paulo Freire's definition of this community participation learning process as reflection/action/reflection through dialogue, it becomes clear that participation is the essence of the learning process, and control of the knowledge outcome of this learning process is the reason for community participation.

With this definition in mind, it becomes clear why the description or classification of the project from the user standpoint, dictates community participation techniques. As long as the water project is regarded as a service or good by the community, the top-down approach of local leadership is sufficient because community assent has already been achieved.[1] This assent exists because the community has come to certain decisions through its local learning systems. All that remains is the communication of information for organization of resources, for which local leadership strategies are well suited.

If, however, the objective is perceived by the community to require reorganization of presently held social beliefs and community organization, it means the community has not yet begun the process of choice and change in its own system. In this case, problem-posing and participatory research participation techniques that will facilitate this learning and decision process are in order.[2]

The inclusion of women as community participators is automatic when this process is undertaken. Women traditionally hold power in the learning process as teachers and purveyors. In rural water supply and sanitation projects, women's roles are especially strong in the specific local learning system pertaining to traditional water technology and health. Thus community participation, under this definition, capitalizes on women's traditional community roles and

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[1] Progress in the Americas, in terms of rural water and sanitation projects has slowed considerably according to WHO 1975 statistics. Burton (1979 op. cit.) discusses the problems of dispersed populations as an underlying reason. A complementary reason would be that in these situations community assent is more difficult to achieve, and more tenuous to maintain. It may be then that all of the service projects have already been undertaken, and the ones that are left are the 'development' projects that demand more time and money and risk a greater chance of failure, dependent upon community decisions.

[2] See Mary Elmendorf's and Patricia Buckles' discussion in 'Research Design and Approach' of "Socio-Cultural Aspects of Water Supply and Excreta Disposal", op. cit., 1978, p. 3.

strengths.

Finally, when the objective of community participation is defined as the control of the knowledge outcome, the relationship that exists between project success and effective community participation is explained. It is simply community control of the new knowledge. Successful development projects are able, often unwittingly, to have their information processed through the local learning system so that the outcome is change or knowledge that results in community controlled growth and development. Unsuccessful projects, because of recipient or user perceived irrelevance, or even danger, are never connected to this system and process, and therefore, the project remains peripheral and unconnected to community growth and development.

RURAL WATER SUPPLY AND LOCAL LEARNING SYSTEMS

In rural water supply projects as in other development projects, design and implementation staff are aware of the importance of community participation and other social factors, but it is difficult to integrate these rather amorphous "software components" with the easier defined and measured engineering and economic "hardware components". Organization of these disparate hardware and software parts into an organizational system is needed. The World Bank has begun description of such a framework, because its lack was found to be detrimental to project design. As justification for this study the World Bank describes the present situation.

> The review suggests that, although World Bank staff working in water and waste section are generally aware of the importance of social and behavioral factors, they may encounter difficulties in incorporating such awareness in project design and implementation decisions ...They are without an operational framework for integrating social and behavioral factors with engineering, economic and institutional issues, and with the project cycle itself.[1]

The Bank publication examines "how a sharper focus on the social and behavioral aspects of projects might improve project design and better ensure that the target populations receive the intended benefits."[2] Through the resulting examination a general framework is established through guidelines, procedural recommendations,[3] and development of "socio-technical packages".

This paper, focusing on the need for participation in rural water projects, develops an 'Operational Framework' that synthesizes the factors of technology, maintenance, local learning systems, and community participation. As an integrated whole it provides information in terms of inter-relationships and interactions of the

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[1] Perrett, Heli, "Social and Behavioral Aspects of Water Supply and Waste Disposal Project Work", World Bank publication, draft, 1979-80, p. v.

[2] Ibid., p. i.

[3] Ibid., p. iii, also see Diagram 2A, "The Software/Hardware Approach to Water/Wastes Services", p. 70.

parts, and explains "how" community participation works in rural water and sanitation projects.

This Operational Framework is a generalized conceptualization of the local learning systems that are present in every community. It can functionally describe a culturally specific situation, through first, capitalizing on the generalizations available from the conceptualization of learning as a process, and secondly the generalizations available from focusing on the subject area of rural water supply itself. The framework is thereby able to explain and clarify to a greater extent how the lack of integration, or the type of integration, for the software and hardware components, affects success. In this section and background for the Local Learning System (LLS) Framework will be discussed, the Framework itself described, and specific uses for project design and implementation will be explained.

The LLS Operational Framework

The analysis of four components provides an understanding of local learning systems as an operational framework, and how it can integrate hardware and software components. These components are:

--The Technology Analysis Component
--The Participation Component
--The Information Component
--The Knowledge Outcome Component

The organization of these disparate hardware and software components into an organizational system also identifies those project areas where design and implementation staff can successfully have input in community participation, and where they cannot. This in turn enables the project staff to make more effective decisions with greater possibilities of success. The following analysis of each of the LLS components will clarify, in terms of community participation, the integration and interaction of the technical and the social aspects in rural water supply project design and implementation.

The description and analysis of the four components that together make up the Operational Framework is described below.

--The Technology Analysis Component. Describes the present water technology and its learning system, and compares it to the project proposed water supply technology. Through this description and comparison, the type and amount of social change necessary for the new water supply to be used and adopted can be identified. For project implementation, this description serves as a guideline for the type of project it is, and what community participation techniques are appropriate. The identification of the

local learning systems also identifies the traditional power base of women in the community.

In rural water and sanitation projects, the local learning systems pertaining to traditional water technology and health at the community level can be identified.[1] The identification of these local learning systems provides the cultural specific information needed for project success. The World Bank previously cited publication has pointed out the need for collecting "social information" that would be of direct use in rural water and sanitation project design and implementation.[2] The Project Analysis Component of the LLS Framework is self directing in its emphasis on information that is of direct use. Questions asked concerning local learning systems that would indicate community motivation include:

1. Is there management of the existing technology?
2. Is there control of information at the community level?
3. Is the new technology incremental in change?
4. Is the new technology congruent to present water values and water organization?

Questions asked concerning rural water institutional resources that would indicate regional and national capacity include:

1. Is there a national rural water supply institutional infrastructure?
2. Is there a regional resource and administrative infrastructure?
3. Is there a maintenance infrastructure with a local or regional manufacture of pumps?
4. Is there regularly scheduled and maintained service, with supply of parts to existing water supply points?

These questions are asked always in reference to a specific traditional

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[1] See Anne Whyte, op. cit., 1976. In this article she explains user choice systems. "My starting point is that rural areas already have user-choice systems. Each area and each community, in some cases over thousands of years, has developed a traditional user choice system that is finely adjusted both to the forms and processes of the physical environment and to the social and economic context of the community. The traditional user choice system is based on detailed knowledge of the area and community, and accords with the users values and understanding. We would do well, therefore, to examine traditional user choice systems in order to design an improved system that embodies an understanding of water use, water organization, and water values, p. 30.

[2] Perrett, Heli, "Note to Staff", June, 1979, p. 1.

water technology and a proposed new water supply technology. The new water technologies that can be considered include: modern hand dug wells; drilled small bore pump wells; drilled motor pump cistern wells; drilled pump well with gravity flow piped water; village fountains, patio connections; and house taps.

--The Participation Component provides a working definition of community participation that is precise in both objective and methodology. Community participation is defined as the learning process of reflection/action/reflection through dialogue. This definition provides designation of the tools needed to effect change, an explanation of why community participation is so important to project success, and provides clearly defined areas of action for project planners and implementors.

The actual community process of community participation is, by its very nature or definition, community controlled and directed. There can be no successful direct input from the exterior. This is obviously a limitation that one is sometimes tempted to try and overcome, through the best of intentions. But finally it is a limitation that must be recognized as inherent in the need for community controlled management of new knowledge, and evolvement of new but shared community perceptions. This control factor also explains why community participation is crucial to project success. Without control of the knowledge outcome there can be no integration of the new information into existing knowledge systems, and thus no evolving community perceptions that are more congruent to project technical installations. This control of the knowledge outcome and resulting changes and development is the ultimate objective of community participation. Recognition of the objective for the community also provides the methodology for both the community and the project staff. That methodology, simply put, is facilitation of learning. The final two components of this Operational Framework concern themselves with different aspects of this process.

--The Information Component aids the knowledge transformation process, central in any local learning system, as it begins. In rural water supply projects, the objective is technology control and value choice. Provision of information to strengthen the process and objectives is a valid input from project implementors. Women are included at this level because they are the managers of the traditional water systems.

This component represents the community participation technique of the problem posing process and participatory research that encourages needed community dialogue for learning, decision making, and value

choices. Some of the methods that have been used to deepen this dialogue include:[1]

--public meetings led by local officials, often later breaking into smaller groups for discussion;

--study teams working as part of the local committee;[2]

--individual interviews with feedback for group decision making;

--group interviews;

--seminars;

--visual documentation;[3]

--drama and culture festivals.[4]

The process encouraged by this community participation technique has been described earlier as "problematizing". It is reserved for those rural water supply projects that are 'development' projects which, "makes it necessary for the presumed beneficiaries of technology to express their values and aspirations before choices are made".[5] If these value choices are not made, the new water supply will remain peripheral to village life, and the familiar scenario described below comes into existence.

> The community has not really accepted or adopted the new water supply system. It is "their system" and "their taps" and "their pumps" and not "ours". It is an alien thing. So when it needs repair, let them repair it. And when spare parts are required, let them supply them or find them. Before long the system fails. First some components go, then others. Finally, no water

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[1] Jackson, Ted, op. cit., 1979, p. 65.

[2] See for example, Elmendorf and Buckles, op. cit., 1978.

[3] For example, "village books" have been mentioned by a number of field workers and researchers as successful.

[4] A good example of this type of technique is found in, "Popular Theatre and Participatory Research", by Z. Krai, et al, Bosele Tshwaraganang Publications, no. 12.

[5] Goulet, Denis, op. cit., 1977.

> comes from the tap or standpost. The community goes back to the old sources, and once again the women and small children are to be seen laughing and chatting at the well or by the stream, and carrying clay pots of water on their heads back to the family compound, scarcely noticing the abandoned standpost as they go.[1]

Project implementors must be aware of the objective and process of community participation as the learning process, and the techniques which facilitates this. Only then can they provide sufficient information and correctly focus the direction of the information. For example, in this type of project, the role as controllers of the local learning system, is crucial. Staff must direct all relevant information not only to the local leadership council where women may or may not be represented, but also to women and men responsible for the ongoing effectiveness of water and health local learning systems as they presently exist in the community.

> --The Knowledge Outcome Component defines the validity and limitation of community leadership strategies. Community leaders are empowered to communicate to outsiders community derived knowledge, and communicate to the community acquired outside information. Misuse of these strategies using leaders to initiate and control new knowledge leads to failure.

The fourth component of the local learning system, knowledge outcome, is related to the community participation technique of local leadership and decision-making strategies. Leaders of a community are given the role of communicators to the outside world, and are expected to explain their community to outsiders. To do this they express their community knowledge outcomes. They also reverse this role and come back to the community and express the knowledge outcomes or perceptions of the outside world to their community. In development work community leaders are the only contact that foreign aid workers normally have with a community. The tendency to inflate the capacities of these groups well beyond the boundaries of their legitimate power and capabilities is normal, given the lack of easy access to others within the community group.

This fourth component of the LLS Framework--knowledge outcome--is helpful in defining the validity and the limitations of community leadership strategies in rural water supply projects. As stated earlier, as long as the community regards the new water supply as a service--one where the technology change is minimal and requires little organizational or social change in the community--community leadership

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[1] Burton, Ian, op. cit., 1979, p. 26.

strategies are sufficient. In other words the knowledge outcome and the assent of the community have been arrived at, and the community leaders are empowered to communicate that assent to the exterior project personnel. The project staff, in turn, will legitimately utilize the community leadership as their conduit for information back to the community. In this situation project requests for financial and construction support are successful.

Problems, however, arise when leadership techniques are asked to perform beyond these boundaries. If the project is a 'development' project and involves substantial organizational and social change, an individual leader's assent cannot be taken for community assent. Even where the assent is recognized as individual, but it is assumed that he or she will be able to initiate and control forthcoming community assent, failure is inevitable. Misuse of the leadership community participation technique in this manner is common, and contributes greatly to project failure.

In summary, the LLS Operational Framework unites, through the interactions and inter-relationships of its four components, the disparate issues of technology, learning and change, community participation and the inclusion of women, into a workable system. The framework establishes the type of community participation demanded by a specific project, and the resulting level of interdependence of the hardware and software aspects of successful rural water supply projects. (See Table 1, p. 44). This in turn establishes guidelines for more successful design and implementation.

Utilization of the LLS Framework

Irregardless of whether rural water supply project designers stress hardware or software approaches, the ultimate vaiable in determining the success of a project is the maintenance element. The possibility of maintenance failure is usually the result of one of three factors--technology, capacity, and motivation.[1] Appropriate water supply installation can be fairly easily defined in terms of technical hardware components. Regional and national capacity levels are more complex, but can be adequately analyzed through quantitative measurements of the software components of institutional and organizational service capacity and economic cost benefit analysis. But similarly adequate analysis of motivation at the community level is most difficult.

Using the Technology Analysis Component of the LLS Operational Framework as a process and content guide, motivation and capacity checklists and measurements are constructed. A checklist of questions, based upon the descriptive explanation of a specific project's community local learning system indicates community motivation. A

[1] Burton, Ian, op. cit., 1979, pp. 27-30.

second checklist of questions, based upon descriptive explanation of the same specific project's rural water supply institutional resources, indicates regional capacity. These two checklists, taken together, provide a first approximation of the amount and type of change a specific rural water project implicitly expects of the community and region. (see Table 2). This first approximation is sufficient to define the project as a "service" or "development' project with corresponding designation of correct community participation techniques.

In using the Motivation and Capacity Checklist, an AID Mission or project design team might decide to analyze several villages or communities in a proposed project area. Using a proposed technology as a reference point, say for instance, gravity flow piped water with patio connection, the analysis and measurement would take place in the following manner.

First, description of the rural water supply national plan, its infrastructure, resources, and organizational management capabilities would be prepared. Second, a description of the present existing water supply technology in the chosen community would be described with its attendant local learning and management systems described. Present user choice systems and underlying patterns for these choices would also be described. In essence, this is a description of social analysis procedure associated with any Agency project identification or project design paper. With one difference--the type of information gathered is pre-identified, and will not change according to hemisphere and continent; the content of that information, will of course, greatly vary. The variation will not only be seen country to country and region to region, but even village to village. The Framework, on the other hand, by calling for the same type of information to be gathered, increases the possibility of relevant national and regional research as this body of similar information grows.

When the description of the rural water supply institutional resources, and the community local learning system surrounding the present technology are completed, the four indicators that measure community motivation and the four indicators that measure regional or national capacity can be answered yes or no. A "yes" answer for all eight indicators would indicate a 'service project'. A "no" answer on all eight indicators would obviously indicate a 'development project'. Each combination of yes and no answers would define either a service or development project.[1]

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[1]This includes all enumerated technologies mentioned earlier. The only exception would be 'modern hand dug wells'. Indicators seven and eight are not necessary for this technology, so it would be classified a 'service project' with four "yes" indicators.

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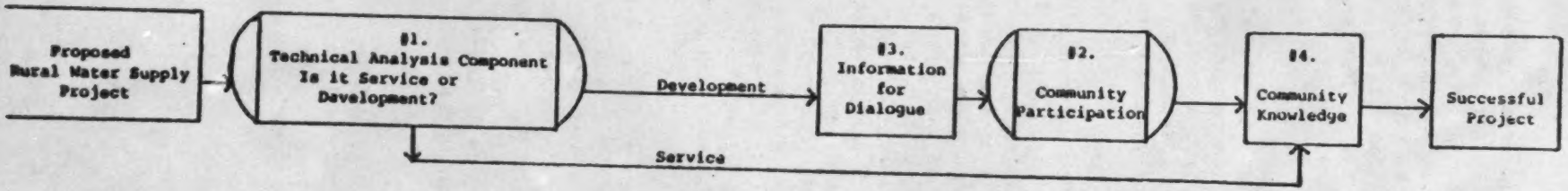
TABLE 1

LOCAL LEARNING SYSTEM OPERATIONAL FRAMEWORK



--Component #1, "Technology Analysis", through questions that measure motivation and capacity to maintain and use a proposed rural water supply project, indicates whether the project can be classified 'service' or 'development'. If the project is a service project, the minimal community participation strategies utilizing local leaders, component #4, are sufficient for project success. If the project is classified as development, community participation strategies that encourage the entire participatory learning process must be utilized for project success.

Presently, what often happens is that 'development' projects attempt to use the minimal community participation strategies suitable only for service projects, thereby ensuring project failure. There is also always the possibility that a 'service' project might use the more profound participation strategies of 'development' projects thereby incurring unnecessary cost to both community and project. This, however, is the rare instance.

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TABLE 2--MOTIVATION AND CAPACITY CHECKLIST

'Motivation'

1. yes __ no __ Is there management of the existing technology? This indicator measures the existence or absence of traditional or adapted techniques used to manage the water supply environment.

2. yes __ no __ Is there control of information at the community level? This indicator measures the control of information the community has. If the information is found to be one-way, either in or out, there is an absence of control. Two-way information indicates dialogue, and some form of control.

3. yes __ no __ Is the new technology incremental in change? This indicator measures the amount of technical change between the existing water supply technology and the proposed new technology. Incremental change that does not demand new organizational patterns is considered to be ideal.

4. yes __ no __ Is the new technology congruent to present water values and water organization? This indicator measures the congruency of new organizational patterns and values demanded by new technology to existing knowledge patterns.

'Capacity'

5. yes __ no __ Is there a national rural water supply institutional infrastructure? This indicator measures the existence or absence of budgeted and professionally staffed national institutions responsible for the improvement of rural water supply.

6. yes __ no __ Is there a regional resource and administrative rural water supply infrastructure? This indicator measures the existence or absence of adequately budgeted and staffed institutions at the regional level for the improvement of rural water supply.

7. yes __ no __ Is there a maintenance infrastructure with a local or regional manufacture of pumps? This measure indicates the existence or absence of an adequately budgeted maintenance department within the national and regional institutions.

8. yes __ no __ Is there a regularly scheduled and maintained service, with supply of parts to existing water supply installations? This indicator measures the existence or absence of demonstrated regular scheduling for maintenance service and a regular supply of parts. Normally this would mean access to locally or regionally made pumps.

--Eight "yes" indicators.....service project

--Seven "yes" indicators.....service project

--Six "yes" indicators, if evenly distributed between motivation and capacity.....service project

--Six "yes" indicators, unevenly distributed between motivation and capacity.....development project
....excellent chance of success

--Five "yes" indicators.....development project
If proper participation mode is followed--good chance of success

--Four "yes" indicators.....development project
If correct participation mode is followed and institution building is addressed..fair chance of success

--Three "yes" indicators.....development project
.....poor chance of success

--Two "yes" indicators.....redesign project

--One "yes" indicator .....redesign project

Certain answer clusters will undoubtedly appear again and again, and therefore deserve some specific comment. In Africa, and countries where the majority of rural water supply projects revolve around communities that presently use hand dug wells or surface water, the project often proposes a change to drilled small bore pump wells. The Motivation and Capacity Checklist would probably show that motivation indicators 1 (management of existing technology) and 2 (control of information) would be given a "yes" answer, while indicator 3 (incremental change) and 4 (congruency) would be given a "no" answer. The capacity indicators would probably register "yes" for 5 (national infrastructure) and 6 (regional infrastructure) and "no" for 7 (maintenance infrastructure) and 8 (maintenance service). The final measurement, 4 "yes" indicators, is a common type of 'development' project that presents problems because it is often designed with only minimal community participation techniques.

One solution is to change the proposed technology to modern hand dug wells, and the project classification is quickly changed to a service project, 6 "yes" indicators = service, (indicators 7 and 8 are not necessary for this technology). National governments and villages are sensitive to this "congruency=service" issue. For instance in the project design process for the AID Upper Volta Rural Water Supply Project, governors of regional development areas and the Director of the National Water Agency ("HER") strongly voiced approval of modern hand

dug wells as short term measures to provide greater quantities of water to rural populations. This consensus was based upon the knowledge that "HER" did not presently have the infrastructure to adequately maintain large numbers of hand pumps, and the observation that modern hand dug wells were more "congruent to the present life style of the village".[1] Villagers too, during the same design process, indicated great interest in the fresh and clean water provided by the small bore pump, but then voiced the opinion that it too often broke down no-one in the village could fix it, and that there was not enough money to send someone to find a repairman.

If a change to a more congruent technology is not possible, decisions must be made as to what chance of success the development project will have. For minimally adequate chance of success both 1 and 2 motivation indicators must have plus ratings. For instance if 1 management of existing technology--does not exist, it will be extraordinarily difficult to identify local learning system purveyors and teachers. If only the capacity indicators 5 and 6 exist without any indication that there is some development of local or regional pump manufacture, future maintenance, after project support is finished, remains doubtful.

In other areas, such as South America, where large amounts of aid have been dispensed to build the institutional capacity for rural water supply projects, a different group of answer clusters will often appear. In this situation, often all four capacity indicators will be measured "yes", while only 1 and 2 of the motivation checklist will receive this answer. As noted earlier, six "yes" indicators (1-2-5-6-7-8) with uneven distribution between the checklists is classified as a "development project" with excellent chance for success. Often, however, this type of project has been considered a "service project" with the minimal community participation strategies of local leadership considered sufficient. If this happens, the technology may well be maintained by the exterior agency, but it does not mean that the technology will be used or maintained by the community as it was intended.

The rural water and sanitation project of Chan Kom, described by Mary Elmendorf and Patricia Buckles seems to be an excellent example of a project that would receive the description of six "yes" indicators (1-2-5-6-7-8) resulting in a 'development project' classification. Their decision to go beyond the minimal local leadership strategies and involve the women, men, and children of the community in "participatory research" techniques of local participation, enhanced immeasurably the chances of project success. It seems that motivation

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[1] HER Proces Verbal de la Reunion du 20 Juin, 1978 pourtout sur le projet "Hydraulique Villagoise dans l'Ouest Volta".

indicator 4 congruency did not exist, but through community participation, encouraged by correct participatory techniques employed by project staff, it was developed.

The LLS Framework and Health Education

The description of the LLS Framework in this section has concerned itself with rural water supply, specifically the use and maintenance of the technology involved. However, it can also be used for design and implementation of the health education components of water supply and sanitation projects.

Traditional health care delivery systems are now recognized as viable systems and starting points for further improvements of primary health care.[1] This recognition is invaluable because the traditional health care system of every community includes a local learning system, which is one of the most easy to identify. In fact, for those communities where little or no management of traditional technology seems to exist, making it more difficult to identify the water technology learning system, exploration and entrance into the health local learning system may well suffice for decisions concerning technological and health care change.

When using the LLS Framework for design and implementation of health education components of water and sanitation projects, each task that the Framework performs for the technology components would be similarly performed for the health education components. For instance, the 'Technology Analysis Component' would become the 'Health Care Analysis Component."

> Describes the present primary health care and its learning system, and compare it to the project proposed health education components. Through this description and comparison the type and amount of social change necessary for the new health education components to be adopted and used can be identified. For project implementation, this description serves as a guideline for the type of project it is, and what community participation techniques are appropriate. The identification of the primary health care local learning system also identifies the traditional power base of women in the community.

The local learning system concept, in this instance at least, can be

[1] For an excellent discussion of these issues see, "Reaching the Rural Poor: Indigenous Health Practitioners are There Already", by Barbara Pillsbury, AID Program Evaluation Discussion Paper Series, no. 1, 1979.

easily transferred, and in actuality both uses should positively reinforce the other.[1]

Finally, in summary it can be said that the LLS Operational Framework incorporates the hardware technology with the software motivation of the community into an integrated design tool. It indicates probabilities of success for different technologies and health education strategies, and is an implementation tool that guides the type, amount, and direction of information through community participation techniques.[2] It continues to offer women the strength of their traditional power, and offers to the community a design and implementation technique that recognizes the inviolability of their inherent control.

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[1] It would seem that the local learning system concept, its definition of community participation, and its insistence upon the needed inclusion of women, would serve well as an ex post facto descriptor and evaluator for such proposed studies as "Effectiveness in Primary Health Care Programming: A Study of Community Outreach and Participation", by Barbara Pillsbury, PPS/E/S Working Paper, no. 15, 1979.

[2] An excellent discussion of the need for community control in water supply is found in "Water Supply and Community Choice", Anne Whyte and Ian Burton, Water, Wastes, and Health in Hot Climates, Feachem, R. et al eds. op. cit., 1977.

POLICY AND PROGRAM DIRECTIONS

Policy for AID

Presently AID policy statements attest to the importance of the software components in rural water supply projects. For instance, the Draft Agency Water Supply and Sanitation Policy Paper (March 1980) makes apparent the relationship between water supply and sanitation and the Agency's basic human needs and development goals. It also makes clear AID's recognition of the importance of software components.

> AID has been a leader in recognizing the many "software" components of water supply and sanitation programs in developing countries, and has for a long time designed programs that take them into account. Major software components include development of national and regional water and sanitation policy and plans, training, hygiene education, the promotion of community participation, the integration of water and sanitation with nutrition and health activities, etc. In many externally financed programs these components are considered as afterthoughts when in fact, they are usually crucial for a program's success.[1]

Until recently, little acknowledgement has been made concerning the motivation behind community participation at the village or community level. In an AID's publication, "Policy Directions for Rural Water Supply in Developing Countries", Burton summarizes the issues.

> Careful selection of technology, career opportunities in water supply, strong commitment by national governments, and other actions at the national level can help ensure that motivation exists to build and maintain water supplies.
>
> Success seems more likely to be assured, however, if the motivation and understanding extends all the way to the village level. This can be achieved with increased attention to health education, to genuine community participation, and by making sure that knowledge of the social and cultural aspects of community life in relation to water supply is developed and used in program planning and project design.[2]

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[1] AID, Draft Agency Water Supply and Sanitation Policy Paper, 1980, p. 11.

[2] Burton, Ian, op. cit., 1979, p. 29.

In view of the foregoing discussion in this paper concerning the importance and role of community participation, and in view of the Agency's interest and leadership in the software component area, several further clarifications and recognitions are needed. Therefore, it is recommended that it be AID policy to:

(1) define success of rural water supply projects as continued full use and maintenance of the water source five years after project support has ended. In other words, maintenance and use, as inter-related factors would be the critical variables in evaluation studies;

(2) recognize that community participation as the learning and decision process that engenders village or community motivation to use and maintain the water supply is crucial to the achievement of this level of success;

(3) recognize that women play, as traditional water managers, a crucial decision making role as to whether the new water source meets their standards of reliability and access, and therefore, whether it should be used and maintained;

(4) recognize that women play, as teachers and purveyors in the local institutions surrounding traditional technology and family and community health care, crucial roles in the learning and development processes of the community as a whole;

(5) recognize that women then, must be involved as active participators, in the community participation process that engenders motivation to use and maintain the new water source.

These statements further articulate the basis upon which successful community participation strategies can be built. In essence, they provide a working definition of community participation which, of course, is essential to all methodologies and strategies formulated to achieve this goal.

Program and Project Guidelines

The need for program and project guidelines is obvious. Presently, AID project design teams in rural water supply have two choices. The first is to design a project that pays only lip service to the complex factors discussed in this paper, and essentially opt for a 'technical' project. This is accomplished by carefully and minutely defining all of the technical and economic considerations of the proposed project accompanied

by project attainment schedules that focus on water supply installation. At the same time only general statements that community participation will be promoted through local leadership strategies, and that women's lives will be improved through lessening of drudgery and improvement of family health. Given the time constraints and professional pressures of design teams, the 'technical project' is too often the choice, despite policy statements to the contrary.

The second choice is to consider and integrate the factors described herein, but the lack of existing frameworks for social and technical factors of rural water supply often frustrates this decision. Therefore, program and project guidelines based upon the LLS Framework offers AID missions and project team members a 'first approximation' framework from which the important questions of project success, as measured by use and maintenance, can be addressed.

Guidelines for AID Country Missions

The following guidelines are general considerations provided by the LLS Framework.

1. Service or development project. Country missions should ascertain whether future projects can be classified as a "service" project or a "development" project. This can be measured using the LLS Framework. If measurements indicate that it will be perceived as a service project by the future users, the Mission can successfully use the present standard set of guidelines for community involvement based upon local leadership participation strategies.[1] If however, the measurements indicated that it should be classified as a development project, the Mission, for success, must further refine their options.

2. Service Project. The first option that the AID mission has is to re-evaluate the water supply technology envisioned for that project and choose a lower technology. The lower level of technology, if incremental and congruent in improvement, would move the project from a development to a service classification. For instance, this would most likely happen when a rural handpump project is changed to a modern hand dug well project. The positive factors in such a decision would include: greater quantities of water than presently available for the project area; much greater possibility of project success in terms of use and maintenance variable; less need for complex and expensive project planning to incorporate massive software implementation.

3. Development Project. The second option that the AID mission can decide upon is recognition of the changes at the village

[1] AID, Draft Agency Water Supply and Sanitation Policy Paper, 1980, p. 17.

level that this project would engender as a development project. Extra funds, more time, and explicit integration of hardware and software components would be necessary adjuncts of a decision to pursue such a project.

4. Program Orientation. If an AID mission finds themselves with a series of rural water supply projects that are classified as 'development', every effort should be made to change from a short-term 'project' emphasis to a long-term 'program' orientation. The application and approval of funding would change from discrete project approval to the ongoing incremental program building and funding of a long-term rural water supply program that would include a variety of specific projects. This would promote the incorporation of social and community participation factors into project design and implementation in the most efficient and qualitative fashion possible.

Guidelines for Project Staff

Rural water supply project design and implementation guidelines can also be based upon the LLS operational framework. The LLS measurement indicates what type of community participation techniques will best promote and facilitate the community controlled participation and learning process needed for project success. The value of this measurement for designers and implementors is that it defines, and through its definition, limits the input and effect that the project can in reality achieve. Guidelines can be placed in three classifications: constraints, valid inputs, and scheduling.

1. Project Design and Implementation Constraints

--Direct control in terms of project acceptance and success through community participation and learning remains with the community.

--Project staff can only indirectly affect this process through community participation techniques.

--The community participation techniques of local leadership strategies are sufficient only for the organizational and information needs of service projects.

--The community participation techniques of problem posing and participatory research can indirectly affect the community controlled process of participation and choices posed by the impending change of the development process, but there is no guarantee that the choices will favor the project change.

--Local leadership strategies do not usually involve women as community participants.

--Problem posing strategies directed towards the specific local learning systems of water technology and health, do include women as strong community participators but are more difficult to identify and more complex to work with.

2. Valid Project Design and Implementation Inputs

--Decisions, based upon LLS measurements of whether to plan and implement a service or development project, is vital to the possible success of the project.

--The type of community participation technique that is valid is indicated by the project type, but subsequently must be formed and shaped for the specific culture.

--The LLS framework offers project staff a general system through which they can carry out country specific research, so that in time, regional comparisons can be made for further refinement of the design and implementation process.

--The inclusion of women in the community participation process, necessary to project success, is promoted through design and implementation components that identify and utilize the traditional strength of women in the local learning systems.

3. Project Design and Implementation Schedules and Workplans

--Schedules for the achievement of software objectives must be as explicitly scheduled as the hardware component objectives.

--Integration of these schedules is necessary and mutual inter-dependence must be established at the design stage and carried on through project implementation.

--Recognition that time schedules and pressures of project design and implementation favor technical projects with quantifiable results is necessary if interdependence is to be established.

--Scheduling of design and project staff in rural water supply projects must include both women and men as sex segregated work divisions and necessity for entrance into many of the 'local institutions' that surround these divisions, necessitate the use of both sexes for adequate coverage and entrance into communities.

In conclusion, the present AID policy statements concerning rural water supply concerns have provided the correct direction. For continued successful efforts and actions for "mass contribution to development, and mass involvement in the decision making process for development", participation must become more than a philosophy or a technique. It must be defined in terms of objectives, methodology, and actions. AID has established its leadership in the recognition of the importance of software components of rural water supply. Hopefully, AID will continue this level of leadership and take action to implement these same components so that the stated goals may be attained.

CONCLUSION: AID ACTION NOW

Pertinent issues of rural water supply and integrating frameworks have been discussed, amplification and clarification of present policy and guidelines that govern rural water supply projects have been suggested. However, the possibility of change in AID is essentially governed by the same rules that control change in a small village, thus perhaps the same methodologies to achieve change are pertinent.

The following actions are relatively easy to plan and undertake in the next twelve months. These actions are based both on local leadership strategies that promote control of knowledge outcome, and problem posing strategies that promote provision of adequate and relevant information. Both types of action should better help enable AID participators as they decide whether this conceptualization of rural water supply issues should be incorporated into the Agency operating agenda. The actions include the following:

* Collection of articles and monographs about "women and water" in a book or special edition of a selected journal. This collection would be oriented to portrayal of women's daily lives and their efforts to provide this sustenance for their family, as well as the more objective questions surrounding project development. Emphasis would be placed upon contributions from third world women and men. Partial funding and support could be solicited from the U.N. public relations section in support of the U.N. Drinking Water Decade.

* Develop, using the Local Learning System Framework described in this paper, a review guideline for rural water supply project papers. The purpose would be to analyze the following factors: integration of the software and hardware of the proposed project; type and provision for community participation; project scheduling that promotes inter-dependence.

* Research is needed, because the LLS is a conceptualization based upon field observation, to further refine and strengthen the framework. Ex post facto research on the Kenya (modern hand dug well) and Thailand (diesel powered motor pumps) rural water supply projects, both evaluated as successful, would be most helpful. Analyses of whether the technologies involved were congruent and incremental in change, whether local learning systems were involved and how these interactions took place would be valuable information.

* Research to establish the efficiency of the LLS Framework

as an implementation methodology is needed. An ideal situation would be to incorporate this research and evaluation in the newly funded Upper Volta Rural Water Supply Project.

* Conduct one day seminar programs for all rural water supply and sanitation design teams for successful accomplishment in the integration of software and hardware project components. Key areas of mutual inter-dependence would be established and discussed.

* Offer similar, but more in depth seminars to mission based staff that are responsible for rural water supply and sanitation projects in the field. Seminars should be on a regional level (for instance the Sahel region) and should emphasize the Mission needs for a coherent 'all of a piece' PID. Why and how needed integration and interdependence of social and technical factors should be achieved, and how it would promote more relevant project papers would be the primary subject of discussions. This should be a service offered to field staff, and at the request of the Mission Director.

* Further research of the LLS Framework as an implementation methodology could be pursued with voluntary agencies such as Peace Corps. The Training Division is presently considering beginning a "knowledge and skills" division, where nonformal teaching and development strategies would be developed for a variety of specific activities. LLS might serve as a beginning basis for the strategies, and be further developed for use in other types of projects, rather than only rural water supply.

In this paper, community participation was defined as the learning process by which communities deal with change and development.

> Using Paulo Freire's definition of the learning process as reflection/action/reflection through dialogue, it becomes clear that participation is the essence of the learning process, and control of the knowledge outcome of this learning process is the reason for community participation.

The carrying out and eventual findings of the projects and research outlined above should enable all of us to further define the specific connection between community participation and project success. And then, perhaps, Kenneth Boulding's contention, "that development, even economic development, is essentially a knowledge process.." will no longer only be a philosophical generality, but a usable methodology.

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